Using Active Learning Instructional Strategies to Create Excitement and Enhance Learning

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"The first objective of any act of learning, over and beyond the pleasure it may give, is that it should serve us in the future. Learning should not only take us somewhere; it should allow us later to go further more easily" (Jerome Bruner)

"The best way to get a good idea is to get a lot of ideas" (Linus Pauling)

What are active learning instructional strategies?

Active learning instructional strategies include a wide range of activities that share the common element of "involving students in doing things <u>and</u> thinking about the things they are doing" (Bonwell & Eison 1991).

Active learning instructional strategies can be created and used to engage students in (a) thinking critically or creatively, (b) speaking with a partner, in a small group, or with the entire class, (c) expressing ideas through writing, (d) exploring personal attitudes and values, (e) giving and receiving feedback, and (f) reflecting upon the learning process

It should also be noted that active learning instructional strategies can (a) be completed by students either in-class or out-of-class, (b) be done by students working either as individuals or in group, and (c) be done either with or without the use of technology tools

When an instructor employs active learning strategies, he or she will typically will (a) spend greater proportion of time helping students develop their understanding and skills (promoting deep learning) and a lesser proportion of time transmitting information (i.e., supporting surface learning). In addition, the instructor will provide opportunities for students to (a) apply and demonstrate what they are learning and to (b) receive immediate feedback from peers and/or the instructor.

Why are active learning strategies instructionally important in college and university courses?

Extensive workshop experience with faculty members indicates that before considering why using active learning instructional strategies is important in college classes, it is first helpful to address "the elephant in the room" by examining the question 'What's wrong with a 50-minute lecture?"

Though a well-crafted and captivating lecture presentation would seem to be an especially time efficient way for an instructor to "cover course content," converging evidence from a wide variety of different types of sources indicates that listening to a classroom lecture is not an especially effective way to promote deep and lasting student learning. As many have long maintained, more commonly

"Lecturing involves the transfer of information from the notes of the lecturer to the notes of the student without passing through the minds of either" (Multiple sources).

For example, watching students today during instructor presentations, in both regular size classrooms as well as large lecture halls, will reveal significant proportions of students (a) daydreaming, (b) attending casually to the lecture, (c) listening to IPods, (d) instant messaging on a cell phone, or (e) playing on a laptop computer. The proportion of students visibly engaged in taking notes in most classes has become all-too-often rather small. Further, the ubiquitous use PowerPoint slides during presentations has led students to anticipate routinely that they will have ready access to these slides.

Further, the lecture method is a relatively poor instructional approach for maintaining student attention (e.g., Bligh, 2000). Research findings suggest that student concentration during lectures begins to decline after 10-15 minutes (e.g., Stuart & Rutherford, 1978). A summary of the different types of evidence offered to support this assertion is provided by Bligh (2000, pgs 44-56). Recently, Wilson & Korn (2007) have both reviewed this literature and questioned this claim, (i.e., largely by raising legitimate methodological and interpretive questions about the early yet often cited studies done in this area). Their critique, however, does not challenge the consistent findings of recent research demonstrating that when compared to "traditional 50-minute classroom lectures," "interactive lectures" produce superior educational outcomes.

For example, over twenty years ago, empirical research comparing lecture methods versus discussion techniques was summarized in the report *Teaching and Learning in the Classroom: A Review of the Research Literature* prepared by the National Center for Research to Improve Postsecondary Teaching and Learning (McKeachie, et al., 1987). The review concluded that "In those experiments involving measures of retention of information after the end of a course, measures of problem solving, thinking, attitude change, or motivation for further learning, the results tend to show differences favoring discussion methods over lecture" (p. 70).

To cite some additional large-scale, high-quality research studies:

Hake (1998) reported the results of one study involving 62 introductory physics courses (N>6000 students). Compared to traditional lecture-based instruction, instructional approaches that promoted interactive engagement produced dramatic student gains in conceptual and problem-solving test scores.

Springer et al. (1998) similarly reported a large meta-analysis of studies examining small group learning in SMET courses (i.e., Science, Math, Engineering, and Technology). Compared to traditional lecture-based instruction, various forms of small group learning produced higher achievement test scores, more positive student attitudes, and higher levels of student persistence.

Knight & Wood (2005), in an article titled "Teaching More by Lecturing Less," report the results of a study completed in a large, upper-division Biology lecture course. When compared to students' performance when the course was taught using a traditional lecture format, students who were taught with (a) in-class activities in place of some lecture time, (b) collaborative work in student groups, and (c) increased in-class formative assessment and (d) group discussion were observed to make significantly higher learning gains and better conceptual understanding.

Over the years, scholars, researchers and national reports have also discussed the importance of employing active learning instructional strategies to maximize student learning in the college or university classroom. Consider individually or collectively the following succinct observations and/or recommendations:

Lectures alone are too often a useless expenditure of force. The lecturer pumps laboriously into sieves. The water may be wholesome; but it runs through. A mind must work to grow (Elliot, 1869).

Faculty should make greater use of active modes of teaching and require that students take greater responsibility for their learning (Study Group on the Conditions of Excellence in American Higher Education, 1984).

Students learn by becoming involved . . .   Student involvement refers to the amount of physical and psychological energy that the student devotes to the academic experience (Astin, 1985).

Learning is not a spectator sport. Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to experiences, apply it to their daily lives. They must make what they learn part of themselves (Chickering & Gamson, 1987).

When students are actively involved in the learning task, they learn more than when they are passive recipients of instruction (Cross, 1987).

All genuine learning is active, not passive. It involves the use of the mind, not just the memory. It is the process of discovery in which the student is the main agent, not the teacher (Adler, 1987).

Experience makes it increasingly clear that purely verbal presentations - lecturing at large groups of students who passively expect to absorb ideas that actually demand intense deductive and inductive mental activity coupled with personal experience - leave virtually nothing significant or permanent in the student mind (Strauss & Fulwiler, 1989/1990).

Tell me and I'll listen. Show me and I'll understand. Involve me and I'll learn. (Teton Lakota Indians)

I hear, and I forget. I see, and I remember. I do, and I understand. (Asian proverb)

What obstacles do faculty members commonly report limit their use of active learning instructional strategies? And, how can these barriers be overcome?

Some commonly mentioned obstacles to using active learning instructional strategies include:

You cannot cover as much course content in class within the time available - Admittedly, the use of in-class active learning strategies reduces the amount of available lecture time that can be devoted to instructor-provided content coverage. Many faculty are surprised to learn, however, that student learning during a fifty-minute class can be enhanced by simply pausing three times for approximately three minutes each (Rowe, 1980); in short, student test performance rose as a consequence of faculty lecturing for ten minutes less while providing three brief periods for student-to-student interaction. In addition, faculty members who regularly use more time-intensive in-class active learning instructional strategies can ensure that students learn important course content through (a) pre-class reading and writing assignments, (b) formative in-class quizzes, (c) brief in-class activities completed individually, with a partner, or in small groups, (d) classroom examinations, etc..

Devising active learning strategies takes too much pre-class preparation - Though the preparation time needed to create new active learning instructional strategies often will be greater than the preparation time needed to "recycle old lectures," it will not necessarily take greater time than the

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preparation time needed to create thoughtful lectures for new courses. In addition, there are now hundreds of published articles describing instructor use of active learning instructional strategies across the disciplines. Project Merlot similarly offers 300 more peer-reviewed classroom activities online - (http://www.merlot.org/merlot/index.htm and search under "active learning").

Large class sizes prevents implementation of active learning strategies - Large class size may restrict the use of certain active learning instructional strategies (e.g., it is difficult to involve all students in class discussion in groups larger than 40) but certainly not all. For example, dividing large classes into small groups can allow for productive in-class discussion activities. Heppner (2007), Stanley & Porter (2002) and Weimer (1987) each offer excellent ideas on how to teach large classes well.

Most instructors think of themselves as being good lecturers (and, therefore, see no reason to change) - Though many view lecturing as a useful means of transmitting information, attending a lecture does not necessarily give rise to student learning. Evidence of this can be seen clearly in the disparity between what an instructor thinks he or she has taught effectively and the actually proportion of course content his or her students successfully demonstrate they have understood and remember on their examination papers.

A lack of materials or equipment needed to support active learning approaches - The lack of materials or equipment needed to support active learning can be a barrier to the use of some active learning strategies but certainly not all. For example, asking students to summarize in writing the material they have read or to form pairs to evaluate statements or assertions does not require any equipment. And while classroom use of personal response devices or clickers has become the current instructional rage (and for many good reasons based upon the findings of numerous studies), low cost alternatives described later in this handout are also available to interested faculty (e.g., IF-AT answer sheets; visit http://www.epsteineducation.com/home/ for more on this)

Students resist non-lecture approaches - Students resist non-lecturing approaches because active learning alternatives provide a sharp contrast to the very familiar passive listening role to which they have become accustomed. With explicit instruction in how to actively participate and learn in less-traditional modes, students soon come to favor new approaches. An excellent text entitled *"Helping Students Learn in a Learner-Centered Environment: A Guide to Facilitating Learning in Higher Education* (Doyle, 2008), offers many helpful suggestions and ideas.

A second set of potentially more difficult obstacles to overcome involves increasing one's willingness to face two types of risks. First, there are risks that students will not (a) participate actively, (b) learn sufficient course content, (c) use higher order thinking skills, and (d) enjoy the experience. And second, there are risks that you as a faculty member will not (a) feel in less control of your class, (b) feel as self-confident, (c) initially possess the skills needed to use active learning instructional strategies effectively, and (d) be viewed by others as teaching in an established fashion.

While trying any new instructional approach will always entail a certain level of risk (for both the instructor and his or her students), many faculty members have reported it helpful to start by first using low risk active learning instructional approaches. Figure 1 (Bonwell & Eison, 1991, p. 66) below contrasts several general characteristics of low- and high-risk active learning instructional strategies.

Figure 1
A Comparison of Low- and High-Risk Active Learning Strategies

Dimension	Low Risk Strategies	High Risk Strategies
Class Time Required [1]	relatively short	relatively long
Degree of Structure [2]	more structured	less structured
Degree of Planning [3]	meticulously planned	spontaneous
Subject Matter [4]	relatively concrete	relatively abstract
Students' Prior knowledge of the Subject Matter [4]	better informed	less informed
Students' Prior Knowledge of the Teaching Technique [5]	familiar	unfamiliar
Instructor's Prior Experience With the Teaching Technique [5]	considerable	limited
Pattern of Interaction [6]	between faculty & students	among students

[1] Short active learning strategies (e.g., the pause procedure) involve less risk that valuable class time will be "wasted" (i.e., not used productively or effectively) than longer activities.

[2] More highly-structured active learning strategies (e.g., short writing activities, debates, case studies) involve less risk that course content will not be adequately covered and that the instructor will not feel in control of the class than instructional activities that are less carefully structured or scripted (e.g., role playing, informal group discussion).

[3] The greater the degree of instructor planning, and the more thorough and thoughtful the instructions that are provided to students, the less the risk that an activity will take an unexpected and/or unproductive turn.

[4] When the subject of a lesson is relatively concrete (e.g., an in-class or out-of-class reading assignment with an accompanying writing activity) and students are relatively well prepared, there is less risk that an activity (e.g., a large-class discussion) will go astray than if the subject of the lesson is relatively abstract and/or students are not adequately prepared or informed (e.g., material supposedly covered either in high school or an assigned pre-class reading).

[5] The more familiar and experienced students and faculty members become with a particular active learning strategy, the less the instructional risk. This is especially true when faculty and students are using relatively new and/or unfamiliar technology tools.

[6] Encouraging the flow of communication between the faculty member and his/her students involves less risk that a discussion will stray off topic or that shy students will not participate than a discussion that encourages student-to-student communication without a moderator.

One especially low-risk high-impact alternative to traditional classroom lectures is the "interactive lecture."

What are interactive lectures?

Interactive lectures are presentations that provide students with multiple brief opportunities for structured engagement. In contrast to the "traditional lecture," interactive lectures involve both (a) several relatively brief segments of "instructor talk" (or mini-lectures) and (b) explicit opportunities for student thinking and responding.

To distinguish further between "traditional" and "interactive lectures" consider the following:

Traditional Lectures	Interactive Lectures
Instructor talks & students listen with minimal interruptions	Instructor talks with periodic pauses for structured activities
Student concentration can be observed dropping after 10-15 minutes	As student concentration begins to wane, a short structured in-class activity is assigned
Instructor's questions are largely rhetorical	Instructor's questions require responses
Students' responses to an instructor's questions are commonly made by students raising their hands	Students' responses to an instructor's questions are commonly made by using a clicker or an IF-AT Answer Sheet
Student-to-student talk is discouraged	Student-to-student talk is encouraged
Students listen and take notes independently	Students often work with partners or in groups
Student comprehension during the lecture is not monitored explicitly	Student comprehension during the lecture is assessed directly
Opportunities to correct misunderstandings are not provided routinely during the lecture	Opportunities to correct misunderstandings are periodically provided within the lecture
Student absenteeism often is quite high	High rates of attendance often are reported

What are some strategies for transforming traditional lectures into interactive lectures?

The breaks between mini-lectures offer instructors countless possibilities for actively engaging students. Popular types of brief, low-risk and high-impact activities that students can complete during the breaks between mini-lecture segments include:

The Pause Procedure (Rowe, 1980; 1986; Ruhl, Hughes, & Schloss, 1980) is an extremely easy and effective approach to promoting greater student engagement with minimal modification to one's traditional lecture presentations. The pause procedure has the instructor pausing for approximately two minutes on three occasions during a fifty-minute lecture (i.e., every 12-15 minutes). During the pauses, students work in pairs to discuss and rework their notes without instructor-student interaction. In one study, the mean score comparison between the pause procedure treatment group and a control group was large enough to equal two letter grades.

Think-Pair-Share is another widely used and highly effective form of promoting brief structured group interaction within traditional lecture sessions. As described originally in the cooperative learning literature (Millis, Lyman, & Davidson, 1995), a think-pair-share exercise often begins with information that provided initially through a reading assignment, a short lecture, a videotape, etc. The instructor then poses a single question and students are instructed to reflect (i.e., think) about the question and to note their response in writing. Students then turn to a partner and share their responses. This can end the sharing or the pair may turn to another pair and share again in groups of four. Provide sufficient time for each participant to speak with his or her partner; the instructor, however, can determine the total time required for the activity by limiting the number of pairs invited to share their responses with the whole class. Think-Pair-Share is a collaborative learning strategy that (1) is effective in very large classes, (2) encourages students to be reflective about course content, (3) allows students to privately formulate their thoughts before sharing them with others, and (4) can foster higher-order thinking skills.

ConcepTests were developed, and their effectiveness clearly demonstrated, by Erik Mazur (1997) to encourage active learning through in-class peer collaboration in physics courses. In this approach designed to focus students' attention on developing conceptual understanding rather than memorization, at intervals of approximately every 15 minutes, Mazur stops his presentation and poses a ConcepTest. The ConcepTest consists of a challenging conceptual question or problem posed in multiple-choice format. Students turn to a partner seated nearby and they work together to reach a common answer (these responses get recorded electronically). Mazur (1997) offers a helpful resource for instructors of physics attempting to transform "conventional lectures to a more interactive format;" the methods described, however, can be applied by faculty teaching in a wide variety of different disciplines. Chapter Two of Mazur's (1997) text *Peer Instruction* is available in electronic form at http://mazur-www.harvard.edu.

Personal Response Systems or "Clickers" provide an exciting new way to actively engage students enrolled in even the largest of classes. For example, Poirier & Feldman (2007) compared student performance in a large (N=418) traditional 75-minute lecture class with student performance in a second section of this same class (N=447) meeting immediately afterwards. Though clicker use made up less than 10% of the total class time, students in the clicker section earned higher exam scores and most, but not all, reported positive attitudes towards clicker use. MacArthur & Jones (2008) have identified 56 publications reporting on the use of clickers in college-level science classes and reported "students have a positive attitude towards the technology and that many benefits and few drawbacks are associated with its use. Research studies show that the use of clickers results in measurable increases in student learning in some cases and inconclusive results in other cases. In every published report of student improvement with the use of clickers, the course included student collaboration of some form" (p. 187).

> Personal Response Cards, or quarter-sheets sheets of four colored papers, with the letters A through D prominently printed on them, can be created by an instructor and distributed to his or her students at the start of the term. To solicit student feedback, students signal their responses to instructor-posed questions by raising their hands while the holding the appropriately colored response sheet. Though lacking the "cool factor" associated with a sexy "instructional techno-tool" such as clickers, I personally have come to think of colored paper as a "Poor Students' Personal Response System." Freeman et al. (2007) recently reported that daily clicker use in a gateway course for biology majors produced significantly lower failure rates, higher exam scores and increased daily attendance. As some faculty might predict, students did better on clicker questions if graded for right/wrong answers versus simply of participation. In addition, in a test to see if clickers were more effective than personal response cards (i.e., my "Poor Students' Personal Response System"), attendance was higher in the clicker section.

Classroom Assessment Techniques or CATs (Angelo & Cross, 1993) are a widely used collection of formative assessment strategies; CATs both actively engage learners as well as assist faculty efforts

to determine how much and how well students are learning. CATs are generally anonymous, ungraded, and brief assessments of student understanding that are completed in-class. Angelo & Cross (1993) describe over fifty such strategies in their outstanding text. "Minute Papers" are probably the best-known Classroom Assessment Technique. Minute Papers engage students by having them respond in writing at the end of a class session to some variation of questions such as (a) What important question remains unanswered? or (b) What was the most important thing you learned during this class?

In addition, building upon Angelo & Cross (1993), Devorah Lieberman and Tom Creed coined the term Techno-CATs to describe an electronic way to collect formative assessment information (in either a synchronous or an asynchronous fashion) about student learning. Information about Techno-CATS is found online at http://www.nea.org/he/head9697/advo9810/feature.html

What are some other active learning instructional strategies to create excitement and enhance learning?

In addition to inserting the above-mentioned activities into breaks between mini-lectures, instructors can use the following instructional strategies for actively engaging students at any point within (or throughout) a class session.

Questioning Purposefully is an extremely effective approach to increasing student engagement as well as fostering critical/creative thinking. This involves the frequent use of classroom questions including (a) questions posed by the instructor to students and (b) questions posed by students to either their classmates or their instructor.

Instructor-posed questions can (a) help arouse student interest and curiosity, (b) sharpen students' thinking skills, (c) demonstrate the application of theory to practice, (d) assess students' knowledge, skills, or attitudes, and (e) prepare students for licensure examinations.

Student-posed questions can (a) stimulate student-instructor interaction, (b) identify areas of confusion or test understanding, (c) formulate personal connections with course content, and (d) encourage student-student collaboration.

An instructor's specific instructional goals for a given class session (or, segment of a class session) should determine the specific types and forms of questions that he or she poses to students. See Appendix 2 on page 21 of this handout for an illustrative set of alternative question types each designed to address a specific type of instructional objective.

A high degree of planning and forethought in advance of class should go into the preparation of discussion questions; just as an instructor might bring a set of lecture notes to class, he/she might similarly insert specific discussion questions into one's lecture notes.

To maximize participation by all students, it is important to adapt the level of sophistication and difficulty of one's questions to students' ability level.

To enhance student comprehension, it is generally helpful to ask questions in a logical and sequential order.

To maintain student interest it is generally helpful to ask questions at various levels (e.g., application, evaluation).

The manner used to pose classroom questions will also impact their effectiveness in promoting effective student engagement. For example, research at all grade levels (Rowe, 1987) has found

that when a faculty member asks his or her students a question, he or she typically pauses but then allows less than one second of silence before speaking again.

"Wait time" is a term used to describe the interval of silence after a teacher's question and the start of a student's reply. Wait time has also been used to describe the interval of silence after a student's answer before the teacher provides further explanation or elaboration.

Research findings on the educational impact of adequate wait time since 1969 have suggested that several significant educational benefits result when faculty members extend the wait time following a question from less than one second to 3-5 seconds (Rowe, 1986). These benefits include: (a) the length of students' responses to your questions will increase dramatically, (b) students are more likely to support inference statements by the use of evidence and logic based on evidence, (c) students do more speculating about possible alternative explanations or ways of thinking about a topic, (d) the number of questions asked by students increases, (e) failures to respond to your questions decreases, (f) student-to-student exchanges increases, (g) the variety of students participating voluntarily in discussions increases as does the number of unsolicited but appropriate contributions, (h) students gain confidence in their ability to construct explanations and to challenge the logic of a situation, and (i) achievement on written measures improves, particularly on items that are cognitively more complex.

"Many faculty habitually arouse their students with an engaging example and initiate discussion with a well-formulated question, only to frustrate them by delivering a spontaneous two- to three-minute mini-lecture after the first student comment. They do not realize that the reason they rarely get a second response is because the readiness that they created in students was dissipated during their own lengthy response" (Lowman, 1984).

Employing classroom demonstrations, when used skillfully, also help arouse student interest and promote memorable learning. Recent research findings have documented, however that "contrary to the common belief that seeing a demonstration makes students understand or at least remember the phenomena, many science instructors have demonstrated that after seeing a demonstration, the majority of students comes away with an incorrect interpretation of what they saw" (Milner-Bolotin et al., 2007, p. 45)

Milner-Bolotin et al., (2007) reported that after observing physics demonstrations (accompanied by the instructor's explanations) students responses to conceptual questions was only 8-12% superior to students who were not shown the demonstrations. When asked to predict a demonstrations outcome prior to seeing the demonstration, student scores rose between 25-35% higher. And, when students had the opportunity to make a prediction, discuss it with peers, and only then see the demonstration, their rate of correct responses was higher than 50% (p. 46)

Assigning short in-class writings are another obvious yet all-too-often overlooked way to increase student engagement during class presentations. Such activities will help (a) stimulate more students to complete pre-class reading and preparation, (b) focus student attention to selective information presented during mini-lectures, (c) stimulate individual reflection and/or problem solving through writing, and (c) increase the proportion of students willing to volunteer a contribution to a subsequent class discussion.

This type of "writing for learning" does not require instructor feedback, correction, or evaluation. Alternatively, such assignments can be turned and used as a time-efficient way of monitoring and/or rewarding regular class attendance. These assignments can, if one prefers, be easily graded as being worth one point for a thoughtful and acceptable response and worth two points for an exceptionally well-prepared response (some of these two point responses might be shared aloud by the student author with the whole class).

Bean et al. (1982) have provided an outstanding description of "microtheme" assignments that are brief essays limited to one side of a 5" x 8" card. Four illustrative types of microtheme assignments include: (a) *the summary-writing microtheme* requiring reading, comprehending and cogently condensing a body of information, (b) *the thesis-support microtheme* requiring the taking a position and defending it with evidence, (c) *the data-provided microtheme* requiring the interpreting of information provided in the form of tables and then commenting on its significance, and (d) *the quandary-posing microtheme* presenting a puzzling situation that must be explained using course content. Thus, depending upon the specific instructional challenge you wish to pose, students are challenged to prepare clear, concise and easily evaluated written responses to a purposeful question addressing important course content.

Butler et al (2001) combined two previously described active learning instructional strategies (i.e., "minute papers" with "think-pair-share") by having students write short responses to instructor-posed content-related questions on index cards and then discuss their responses in groups of 2-3. This activity motivated increased attendance and was well received by students

Drabick et al. (2007) demonstrated that 5-minute ungraded free-writing assignments on lecture material gave rise to increased attendance and improved performance on both factual as well as conceptual multiple-choice exam questions when compared a control group who spent the 5-minute period simply thinking about the material (i.e., without doing any writing).

Using brief get-acquainted icebreaker activities and/or subject matter warm-ups - Students are more likely to become excited about, as well as participate actively in, a class in which they know other students. In fact, when asked why large numbers of students typically do not pose the questions they have about complex course content to their instructors, and why relatively few students actually participate during in-class group discussions, students commonly acknowledge their hesitancy to speak and possibly embarrass themselves in front of a group of strangers. Thus, the frequent use of social icebreakers at the start of each new term, as well as the periodic use of course-relevant brief warm-up activities in the opening minutes of class sessions, can have great a great positive impact on reducing this formidable obstacle to in-class discussion.

Having brief "Who was this person and why might we care?" student presentations – Students often complete reading assignments without ever personally wondering about (or being asked to reflect upon) the source of the information they are learning. Further, many of today's undergraduates incorrectly assume that each of the prominent individuals discussed or cited in textbooks are white males. One way to arouse student interest and curiosity about course content is to have students research the lives of the many noteworthy individuals whose work has contributed significantly to topics mentioned in their textbook and/or explored in your course. Thus, students can make short presentations addressing the theme "Who is this person and why might we care?" For added relevance, in addition to concisely providing some traditional biographical highlights, students could also investigate what this prominent contributor to the field was like when he or she was an undergraduate student.

Infusing humor into class sessions (e.g., "Joke of the Day" "Top 3, 5, or 10 Lists") - Given what we know about the positive benefits of humor in the college classroom (Berk, 1996; Garner, 2006; Took et al. 2004), inserting a "Joke of the Day" into class sessions is another type of brief energizing interlude that can become a part of one's pedagogical repertoire. Better still from an active learning perspective, share the responsibility for bringing to class "course and audience appropriate" humor (e.g., cartoons, riddles, jokes, humorous mnemonic devices) with your students.

Using popular films and video-vignettes to stimulate critical/creative thinking - Using illustrative excerpts from popular films is all-but-certain to elevate student interest and can easily stimulate focused critical thinking and personal reflection by students. For example, in a faculty workshop

setting, participants can be challenged to reflect upon and talk about specific elements of effective college and university teaching after viewing brief classroom vignettes taken from the memorable performances provided by (a) Edward James Olmos in *Stand and Deliver*, (b) Richard Dreyfuss in *Mr. Holland's Opus*, (c) Robin Williams in *Good Will Hunting*, (d) Barbra Streisand and Jeff Bridges in *The Mirror has Two Faces*, and (e) Julia Roberts in *Mona Lisa Smile*. And James Rhem (1996) in a conference presentation entitled "The Teacher in the Movies" examined the following 12 film classics: "Goodbye, Mr. Chips," "Apartment for Peggy," "Blackboard Jungle," "The Prime of Miss Jean Brodie," "The Paper Chase," "Dead Poets Society," "Lean on Me," "Stand and Deliver," "Dangerous Minds," "Educating Rita," "Waterland," and "Mr. Holland's Opus." If you are unfamiliar with one or more of these film titles, test my assertion for yourself by viewing the "movie trailer' posted on YouTube. Please exercise caution, however, in that viewing the trailer is likely to give rise to the desire to watch the film in its entirety; this will require the investment of both a DVD rental fee and significantly more time. In addition, the Faculty Center for Excellence in Teaching at Western Kentucky University has prepared an interesting guide to *Teaching With Film Across the Curriculum* available online at http://www.wku.edu/teaching/booklets/film.html.

Inviting effective guest speakers – Students like few class periods less than those in which an ineffective guest speaker delivers a boring talk lasting the entire session. Conversely, adding the voice of an especially knowledgeable and instructionally effective invited speaker can bring both "outside authority" and possibly enhanced student inspiration to your classroom. In short, the thoughtful selection of one or more potential guest speakers, combined with skillful pre-class planning to adequate prepare both the speaker and your students, can excite student interest in a topic and stimulate lively in-class discussion. Sorenson (2001) offers some helpful advice in *Guest Speakers: Agony or Ecstasy* (online at http://fc.byu.edu/opages/reference/newslet/v9n2.pdf). For example, Lynn recommends "First, when inviting the expert, steer clear of these terms: speech, presentation, lecture (*unless* you have heard the expert "do their thing" and you want that *exact shtick* reproduced; then say, "Please do the PowerPoint presentation you did at the 2nd Annual Utah Crustacean Rally in July."). Otherwise, invite the guest to "spend a half-hour with us," "visit our class," or "allow us to get acquainted with you." It is also worth noting that if all the pre-requisite technology tools are available to you on your campus, consider also bringing one or more prominent "virtual guest speakers" from their home campuses to your class. In either format, to reduce the risk level associated with this type of active learning instructional strategy, make certain that your students thoughtfully pre-plan and prepare "interview questions" prior to guest speaker visits.

Connecting course content to current events - Yet another approach to energizing students' attention and helping students develop a clearer sense of the personal relevance and significance of course content involves introducing a daily (or weekly) "Breaking News" items. After personally modeling and establishing a pattern of how this is best done at the start of each semester, assign students the task of (a) locating current news items illustrating or relating to important course content, and (b) making a brief in-class oral presentation about the news item found. Alternatively, each student can be required to prepare a brief written synopsis of his or her news item for posting on an electronic discussion board or course website. In a relatively short amount of time, you will have a rather large collection of current illustrative material to both keep your classes "fresh" and your students actively engaged. And if you also want to help your students develop greater global awareness as they learn about your discipline, consider having report on relevant current events stories as presented by newspapers of differing regions of the world; numerous websites provide easy access to such resources (e.g., http://www.refdesk.com/paper.html; http://www.ipl.org/div/news/)

Transforming study guides into puzzles – Creative faculty can learn an important lesson about designing challenging instructional activities to arouse student motivation (e.g., to review important course content) from the countless number of newspaper readers who start their day by attempting the daily crossword puzzle. In contrast to the oftentimes-dull act of completing and then later mechanically memorizing material transferred from textbooks and lecture notes onto paper-and-pencil study guides, relatively easy-to-learn computer software, combined with a little instructor creativity can

transform ordinary test review sheets containing such things as important terms, people, facts, etc. into engaging crossword puzzles. Software for this is found at (a) http://www.puzzle-maker.com/CW/ (b) http://edhelper.com/crossword.htm and (c) http://www.armoredpenguin.com/crossword/. After distributing a few illustrative instructor-prepared samples early in the term, challenge students to work either individually or in small groups to create and share with classmates their own original puzzles later in the term.

Employing "high-interest low-stakes" in-class contests – In my experience working with both students in classroom contexts and faculty groups in workshop settings, problem-solving games and contests area are almost universal energizers and crowd pleasers. Friendly and instructionally effective competition among individuals or between groups follows instantly from the mere promise of a small prize to the winning team or individual. According to Tom Verhoeff (1997), "Marcus Verrius Flaccus, a Roman teacher famous in the late 1st century BC, is credited to have introduced the principle of competition among his students as a pedagogical aid. He awarded attractive books as prizes." If for no other reason, this historical example suggests one productive use for unsolicited "publisher-provided textbook examination copies" that commonly form into a large pile on the floor of faculty offices. More readily obtained but equally sought after by students are prizes such as small individually wrapped candies; for this reason, I generally keep a small supply of Hershey's Kisses or Dove chocolates in my office. I have also known other faculty members who keep a roll of quarters in a pocket for use either as positive reinforcement for a desirable student response or as a small prize for each member of a group. One faculty member in a College of Business has developed a bit of a campus-wide reputation for using dollar bills as prizes; for obvious reasons, this is not something I personally recommend to those faculty members teaching in the Humanities or Education. As with many other applications of active learning instructional strategies, variety is essential to reduce student fatigue and boredom. Thus it is wise to vary both the types of high-interest low stakes contests employed, as well as the criteria chosen for identifying the "winners" – e.g., the first correct response; the most creative response; the response offered with the greatest amount of supporting evidence; the longest list, etc.

Creating classroom versions of television game shows - Create classroom versions of television game shows – Today, faculty members can easily bring the excitement of TV Games Shows into their classrooms to stimulate the lively review of course content. And, such activities similarly provide instructors with an informal method to assess students' mastery of challenging topics. Fortunately, instructors do not need advanced computer programming skills and/or other sophisticated technology skills to accomplish this. Free and relatively easy-to-learn educational software is readily available at websites such as (a) http://superteachertools.com/, (b) http://facstaff.uww.edu/jonesd/games/ and (c) http://jc-schools.net/tutorials/PPT-games/ as well as through Project Merlot (http://www.merlot.org). Alternatively, a variety of alternative other software programs are available for purchase (e.g., http://www.almorale.com/classroom.html).

Creating haiku assignments – As many faculty members may remember from their elementary school days, haiku (hy-koo) is a traditional Japanese verse form noted for its brevity. "In three lines totaling seventeen syllables measuring 5-7-5, a great haiku presents, through imagery drawn from intensely careful observation, a web of associated ideas requiring an active mind on the part of the listener" (Source: http://www.geocities.com/Tokyo/Island/5022). Brought back to mind when I read a piece of computer humor circulating on electronic discussion board lists, I recently investigated the potential use of haiku assignments to stimulate students' creative thinking about course content. While I have recently learned that the original discussion board posting has since been reported to be an urban myth (Source: http://www.snopes.com/computer/internet/haiku.asp), here are three humorous haikus from it: "Haiku Computer Error Messages from Japan – (a) 'Out of memory. We wish to hold the whole sky, but we never will.' (b) 'The website you seek cannot be located, but countless more exist.' and (c) 'Yesterday it worked. Today it is not working. Windows is like that.' My research also revealed that to celebrate Earth Day, the American Chemical Society sponsors a haiku contest for K-12 students. For example, the 2007 theme was "Recycling—Chemistry Can!" The winning entry in the

Grades 9-12 category was "Striving to live green the past made into present a future renewed (Ryan Mercure, Grade 11). Having students author original course-related haikus is one many possible ways to stimulate students' creative thinking about discipline-related material. Inviting students to author course-related poems, limericks and/or rhyming mnemonics are other variations of this general assignment theme. In terms of the previously described risk-model of active learning, it is worth noting that some students will truly relish the opportunity to express their thoughts and understandings in this fashion; not all college and university students (or faculty members), however, will respond favorably to this type of non-traditional creative-thinking exercise. Presented as an optional assignment or as an extra-credit opportunity will generally reduce most student questions and concerns.

Having students prepare "Public Service Announcements" - A public service announcement (PSA) "is a non-commercial advertisement broadcast on radio or television, ostensibly for the public interest. PSAs are intended to modify public attitudes by raising awareness about specific issues (Source: http://en.wikipedia.org/wiki/Public_service_announcement). Having students create PSAs challenges them to (a) research a topic, (b) synthesize the findings, and (c) communicate the most important information learned in a very brief fashion. Provide students with alternative formats for sharing their PSA's with their classmate is encouraged; while some students will prefer to prepare printed brochures, others might favor preparing a live in-class performance and others still might make short videotape presentations (that they might enjoy later posting to YouTube). Requiring students to prepare a more comprehensive research paper is also an option available to instructors.

Integrating web-site use and/or creation into course assignments – Given that the World Wide Web has undeniably become today's students "go to place" for finding information, faculty members across the disciplines have an instructional responsibility for helping students learn to critically evaluate the information they find. Consequently, as academic librarians readily attest, much valuable scholarly attention has already been devoted to this challenge. Though an in-depth analysis of this literature is well beyond the scope of the present document, two illustrative examples of ways discipline-based instructors have employed active learning instructional strategies to address this important instructional challenge are worth noting.

Sanchez, Wiley & Goldman (2006) identified four primary areas that undergraduate students needed support when thinking about information found on the World Wide Web: "(a) considering the source of the information, (b) considering the evidence that was presented, (c) thinking about how the evidence fit into an explanation of the phenomena, and (d) evaluating the information with respect to prior knowledge." To address these needs, the researchers developed and then empirically tested "an educational unit in which students were taught to consider the Source, Evidence, Explanation, and evaluate the information given in terms of their prior Knowledge (SEEK). This unit represents a set of activities designed to help learners adopt a critical stance while doing research online and with multiple sources by encouraging (1) thinking about the reliability of Sources, (2) evaluating the Evidence and Explanations provided, and (3) relating new information to prior Knowledge. Thus, this training encourages learners to not only consider information about the source itself, but also the nature of the information that is presented by each source and how well this information coincides with relevant prior knowledge" (pgs. 662-663). The authors found that compared to a control group, students who had completed the SEEK unit were not only better able to learn to use critical evaluation skills during training but were also able to transfer these same inquiry based skills to another task.

As a alternative to a research paper assignment in her Business Law class, Hotchkiss (2002) created a web page project that required "small groups of students to analyze and research a problem, prepare analyses in the form of web sites, post their web sites as a reading assignment for the remainder of the class, and present their analyses to the class." Among the positive outcomes reported from this assignment, Hotchkiss noted, "Asking students to solve problems using a new medium of communication encourages students to examine that medium with a critical eye. Although most will never be web designers by profession, the process of trying their

hands at web site creation allows them to see this medium in a wholly new way. They participate in building the frame of a house, rather than simply looking at the exterior. Once they know the construction process, they will not see the house in the same way again (pgs. 243-244)."

Integrating debates into course assignments - Classroom debate assignments help students (a) learn to locate information, (b) think critically, (c) formulate persuasive arguments and counter-arguments, and (d) express themselves in oral and written forms. While an early account of using debate as a teaching strategy dates back to when Protagoras taught in ancient Athens, classroom debates have been gaining increasing visibility and popularity across higher education over the past thirty years.

Using case method teaching - Case method teaching commonly refers to an instructional approach first introduced at Harvard Law School in 1870 and subsequently adopted by the Harvard Business School in 1908 (Weaver et al, 1994). In his "shorthand guide" on how to use teaching cases, Husock (2000) succinctly notes "Teaching cases - also known as case studies - are narratives designed to serve as the basis for classroom discussion. Cases do not offer their own analysis. Instead, they are meant to test the ability of students to apply the theory they have learned to a "real world" situation. (Source: http://www.ksgcase.harvard.edu/). For a rich and informative online resource on essential case method "how-to" issues, visit http://www.hbs.edu/teachingandlearningcenter/in-practice/index.html.

Having students do in-class role-plays – When skillfully designed and facilitated, classroom role-plays are an especially effective active learning instructional strategy for (a) arousing student interest and engagement, (b) providing a realistic and relevant way for students to connect essential course content to their personal and/or professional lives, (c) teaching students to develop and apply critical thinking skills, (d) creating opportunities for knowledge transfer as well as developing deeper self-awareness and understanding, and (e) helping students develop increased empathy for others and a valuing of and respect for cultural diversity.

Using cooperative learning strategies - Cooperative learning strategies involve the use of small groups so that students work together to maximize their own and each other's learning (Johnson, Johnson, & Smith (1991).

Johnson, Johnson, & Smith (1991) note "A crucial difference exists between simply putting students in groups to learn and in structuring cooperation among students. Cooperation is not having students sit side by side at the same table to talk with each other as they do their individual assignments....To be cooperative, a group must have clear positive interdependence, members must promote each other's learning and success face to face, hold each other personally and individually accountable to do his or her fair share of the work, use appropriately the interpersonal and small-group skills needed for cooperative efforts to be successful, and process as a group how effectively members are working together. These five essential components must be present for small group learning to be truly cooperative" (pp. iii-iv).

An essential element of this type of student group work involves the use of "cooperative learning structures" which are the "content-free building blocks or tools of cooperative learning used by instructors to help students learn specific course content. A brief yet outstanding paper describing cooperative learning fundamentals, entitled *Enhancing Learning – And More!- Through Cooperative Learning,* by Barbara Millis, can be found at http://www.idea.ksu.edu/index.html. Better still is the text *Cooperative learning for Higher Education Faculty* by Millis and Cottell (1998). As Barbara astutely asserts "The power of cooperative learning lies in its ability to promote what is known as deep learning. Deep learning does not occur simply because students are placed in groups, however. It emerges from the careful, sequenced assignments and activities "orchestrated" by a teacher committed to student learning."
(Source: http://www.tltgroup.org/resources/rmillis3.html).

Another exciting small group cooperative learning structure is <u>Structured Academic Controversy</u> (e.g. Johnson & Johnson, 1998; 1993; 1997; Johnson, Johnson, & Smith, 1996). Academic controversy exists when one student's ideas, information, conclusions, theories, and opinions are incompatible with those of another student, and the two seek to reach an agreement" (Johnson, Johnson, & Smith, 1996). Structured academic controversy is a systematic, and sequential instructional method for stimulating critical and creative thinking, promoting student collaboration, and ensuring that students view an event or problem from multiple perspectives.

In this approach, place students into cooperative learning groups of four students and then divided again into two pairs. The instructor then guides students through the following steps:

<u>Research and prepare a position</u>-- Each pair develops the position assigned, learns relevant information about it, and plans how to present the best case possible to the other pair.

<u>Present and advocate their position</u>-- Each pair makes a presentation to the opposing pair, with each member of the pair participating.

<u>Engage in an open discussion, refuting the opposing position and rebutting attacks on their own position</u>-- Students argue forcefully and persuasively for their position, presenting as many facts as they can to support their point of view.

<u>Reverse perspectives</u>-- The pairs reverse perspectives and present each other's positions.
<u>Synthesize and integrate the best evidence and reasoning into a joint position</u>-- The four members of the group drop all advocacy, synthesizing and integrating what they know into factual and judgmental conclusions.

<u>Exploring team-based learning course redesign</u> - As described by Michaelsen (1992), "The primary features of team learning include: (1) permanent and purposeful heterogeneous work groups; (2) grading based on a combination of individual performance, group performance, and peer evaluation; (3) the majority of class time devoted to small group activities (necessitating a shift in the role of the instructor from dispenser of information to manager of a learning process): (4) a six-step instructional activity sequence, repeated several times per term that makes it possible to focus the vast majority of class time on helping students develop the ability to use concepts as opposed to simply learn about them" (p. 109). Michaelsen, Knight, & Fink (2004) and Michaelsen, McMahen, Levin, & Parmalee (2008). are must read texts on this especially exciting instructional approach. Visit also the team-based learning website at http://faculty.ucmo.edu/teambasedlearning/index.htm.

<u>Creating field trips (real, simulated or virtual)</u> – Taking students outside of the traditional classroom on a carefully designed educational field trip can achieve a wide range of powerful learning outcomes (e.g., DeWitt & Storksdieck, 2008). On a foundational level, field trips offer the obvious opportunity for students to create strong authentic connections between oftentimes-abstract academic material and their own life experiences. For example, under the direction of a creative instructor, a short and simple walking tour around campus can provide a wealth of educational opportunities to illustrate concepts previously presented only through textbook readings and/or in-class presentations. Involving only slightly more complexity, a five-minute drive from my own campus can provide students a dramatic experience with (or view for the less adventuresome learners) real-world applications of principles of physics on the thrill rides (e.g., roller coasters) found at a local amusement park (i.e., Busch Gardens). A field trip to this same location, however, might similarly be an ideal location to take students studying plants, animal behavior, social psychology, marketing, tourism, culinary arts, etc. And virtual field trips provide faculty with the opportunity to use available technology tools address many of the instructional and logistical problems associated with actual field trip excursions (e.g., time constraints, travel complexities, economic cost, lack of adequate institutional support, liability issues). Thus, a virtual field trip to an art museum, a historical site (either found here in the US or elsewhere on our planet or from some other time period – e.g., excavations of ancient civilizations), a national

park or a location of great geological significance will all add both excitement and instructional impact to a class. Field trips, like several other types of active learning approaches, might initially appear to be a complex and high risk instructional strategy; however, thoughtful planning, careful attention to providing clear instructional structure, and a reading of published literature describing ways faculty have successfully incorporated field trips into their own classes, will significantly reduce the anticipated risk level. Articles by Klemm & Tuthill (2003) and Jacobson, Militello, & Baveye (2009) identify some best practices for planning and creating virtual field trips.

Using Summative Assessment Strategies- Giving a test or quiz to measure student learning for purposes of grading offer yet another approach to stimulating active student engagement both in- and out-of-class. There is considerable research evidence to support the proposition that the nature of the classroom test given influences what students study and how students learn (e.g., see *Will That Be On The Final?* by Ohmer Milton, 1982). For example, the "two most frequently asked questions on all campuses are: 'Will that be on the final?' and 'Will the test be objective or essay?' If the answer to the first question is 'no,' studying and learning often cease. If the answer to the second question is 'multiple-choice' students will memorize isolated facts; but if the answer is 'essay,' students will attempt to exercise higher-order mental processes such as critical thinking and evaluating" (Milton, Pollio, and Eison, 1986). Thus, well-designed and carefully constructed traditional quizzes and tests (e.g., multiple-choice, essay) can, for example, be used to enhance learning when they focus clearly on important learning goals (rather than isolated pieces of factual information) and are accompanied by supportive instructional activities and materials that help students prepare for the challenges posed on the test. Tobias & Raphael (1997a; 1997b), for example, have assembled an extensive collection of brief descriptive reports describing how summative and formative assessment strategies have been used successfully by faculty teaching science courses to enhance student learning.

Concluding Observations

True learning involves figuring out how to use what you already know in order to go beyond what you already think (Bruner, 1983))

Start with modest expectations (i.e., think big but start small). Felder & Brent (1996) offer some several excellent tips for getting started in an article available online at http://www2.ncsu.edu/unity/lockers/users/f/felder/public/Papers/Resist.html).

One must learn by doing the thing; for though you think you know it, you will have no certainty until you try (Sophocles).

As long as one keeps searching, the answers come (Joan Baez).

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Appendix 1
Purposeful Questions: Illustrative Uses and Question Types

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Context: J. Michael Bishop (1984) asserted: What are the purposes and priorities of teaching? First, to inspire. Second, to challenge. Third, and only third, to impart information.

Examples of questions to stimulate students' _critical thinking_ about this observation:

What is the main point you think J. Michael Bishop is making in this statement? – This illustrates a question that *asks students for clarification*?

Are there any notable similarities and/or differences between the items on your list and those provided by J. Michael Bishop? – This question challenges students to *compare and contrast ideas* provided by two sources (i.e., contrasting their own with those provided by an authority)

What are some possible underlying assumptions behind J. Michael Bishop's statement? – This question challenges students to demonstrate the critical thinking skill of *identifying assumptions* made by an author.

What alternative assumptions might an educator make? - This question further probes students' understanding of assumptions by asking students to *identify alternative as*sumptions that might be made.

Do you personally agree with J. Michael Bishop's assertion and what types of evidence can you offer to support your position? – These two critical thinking questions ask students to both *take a personal position* and to *provide relevant information or evidence to support their decision*.

Examples of questions to stimulate students' _creative thinking_ about this observation:

How many different instructional implications can you list that might follow from accepting the purposes and priorities of education stated in J. Michael Bishop's assertion? This question challenging students to come up with as many possible different ideas as they can and elicits the type of creative thinking process that has been described in the literature as *fluency*

If J. Michael Bishop wanted to identify five essential purposes and priorities of teaching instead of only three, what two additional possibilities would you suggest he add to his list? This question, requiring students to embellish or expand upon ideas, elicits a type of creative thinking process that has been described in the literature as *elaboration*

What novel, unique, or unusual types of course activities and assignments do you think are most likely to inspire today's college and university students? This type of question illustrates one approach to stimulate the creative thinking skill of *originality*.

Examples of questions to stimulate students' _curiosity_ about this observation

Who is J. Michael Bishop and why might people be interested in his perspective on this topic?

What was J. Michael Bishop like as a student?

Quotation Source: Bishop, J. M. (1984). Infuriating tensions: Science and the medical student. *Journal of Medical Education*, 59(2), 91-102.